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Multiple Levels of Analysis
Investigation of
Transformational Leadership

ONR-TR-4

Francis J. Yammarino and Bernard M. Bass

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Abstract

Transformational leadership was clarified conceptually in this study by focusing on leader-follower interactions in terms of multiple levels of analysis. Transformational leadership also was examined in comparison to transactional and laissez-faire leadership, and in relation to outcomes of leadership. The focal leaders were 186 United States Navy Officers who were graduates of the United States Naval Academy and on active duty assigned to the surface warfare fleet. Data about the officers were collected from 793 senior subordinates of the officers via a mail survey. Results from Within and Between Analysis (WABA) suggest that, while a few relationships were based on between groups (leaders) differences, the network of relationships was based primarily on individual differences in subordinates' perceptions of leadership and outcomes. As such, an information processing or individual differences rather than between groups or within groups view of transformational leadership seemed more likely. Moreover, transformational leadership as compared to transactional or laissez-faire leadership was related more strongly to subordinates' extra effort and satisfaction with the focal officers and the officers' effectiveness.

Multiple Levels of Analysis Investigation of Transformational Leadership

Transformational leadership is a well known and widely researched topic in management, psychology, sociology, and political science (Avolio & Bass, 1988; Bass, 1985; Bass & Avolio, in press; Bass, Waldman, Avolio, & Bebb, 1987; Bradley, 1987; Burns, 1978; Conger & Kanungo, 1988; Hater & Bass, 1988; House, 1977; Howell & Frost, in press; Kuhnert & Lewis, 1987; Waldman, Bass, & Einstein, 1987; Waldman, Bass, & Yammarino, 1988; Yammarino & Bass, 1988). Some foundation principles of transformational leadership appear in the work of Max Weber (1923/1963) on charismatic leadership. But Burns (1978) was the first to specify the distinction between transactional leaders who attempt to satisfy the current needs of followers by focusing attention on exchanges and transformational leaders who attempt to raise the needs of followers and promote dramatic changes of individuals, groups, and organizations. A transactional exchange of rewards with subordinates for the services they render also limits how much effort will be forthcoming from the subordinates, how satisfied the subordinates will be with the arrangements, and how effectively they will contribute to reaching the organization's goals. In contrast, the transformational leader articulates a realistic vision of the future that can be shared, stimulates subordinates intellectually, and pays attention to the differences among the subordinates (Bass, 1985).

Despite the plethora of work on transformational leadership, a key issue has been largely ignored. In particular, whether transformational leadership is an individual differences phenomena residing "in the eye of the beholder" (e.g., Eden & Leviatan, 1975; Lord, Binning, Rush, & Thomas, 1978), a dyadic phenomena based on interdependent relationships within a

work group (e.g., Dienesch & Liden, 1986; Graen, Novak, & Sommerkamp, 1982), or a group-based phenomena dependent on the leader's style toward the group as a whole (e.g., Kerr & Schriesheim, 1974; Schriesheim & Kerr, 1977), has not been examined. Thus, the issue of multiple levels of analysis as it relates to transformational leadership has not been explicitly specified conceptually nor assessed empirically. The purpose of this study was to provide such a conceptual clarification and empirical test of transformational leadership by focusing on leader-follower relationships in terms of multiple levels of analysis. To accomplish this, a conceptual-empirical approach developed by Dansereau, Alutto, and Yammarino (1984) was used in the current investigation.

Conceptualization

Multiple Levels of Analysis

Implicit in many of the writings on transformational leadership are several views about the nature of interactions or relationships that followers have with transformational leaders. Work in other areas of leadership research and the approach of Dansereau, et al. (1984) can be used to clarify conceptually these views.

First, leaders can portray a similar style toward an entire group of subordinates resulting in a similar (or identical) relationship with each subordinate in the group (see Kerr & Schriesheim, 1974; Schriesheim & Kerr, 1977). This model of leader-follower interactions is referred to as the Average Leadership Style (ALS) approach or a whole groups model (Dansereau, et al., 1984). In this case, there is a lack of differences within groups in leader-follower relationships (homogeneous leader-follower interactions), but relationships with followers are different across leaders. For example, in terms of the charismatic and inspirational dimensions of transformational

leadership (Bass, 1985), all followers of a leader might have a favorable relationship with him/her, while all followers of another leader might have a less favorable relationship with that leader. Also, *associations among* charisma, inspirational leadership, and leaders' effectiveness might be based on a whole groups, ALS approach (see Bass & Yammarino, 1988).

Second, relationships between leader and followers may occur on a one-to-one basis within a group, with the superior displaying a different style toward each subordinate. Styles of interaction vary within the group or across dyads that are interdependent within the group (Dansereau, Graen, & Haga, 1975; Graen, et al., 1982; Seers & Graen, 1984). This approach has been labelled the Leader-Member Exchange (LMX) approach or a group parts model (Dansereau, et al., 1984). In this case, there are differences within groups in leader-follower relationships (heterogeneous leader-follower interactions), and multiple leaders display these differing styles. For example, in terms of the individualized consideration and intellectual stimulation dimensions of transformational leadership (Bass, 1985), some followers of a leader might have a favorable relationship while other followers might have a less favorable relationship with the leader. Also, associations among individualized consideration, intellectual stimulation, and leaders' effectiveness might be based on a group parts, LMX approach (see Bass & Yammarino, 1988).

A third perspective on leader-follower relationships can be labelled the Information Processing approach. In this approach, interactions between a superior and subordinates are not grouped based, but depend on how each individual cognitively interprets the leaders' behavior; i.e., based on individual differences (Eden & Leviatan, 1975; Lord, et al., 1978; Rush, Thomas, & Lord, 1977). In this case, referred to as equivocal by Dansereau,

et al. (1984), there are differences within and between groups and leaders so that leader-follower interactions are individualized and not group-based. For example, the nature of a relationship with a transformational leader is in the "eye of the beholder" or each follower and not dependent on the other followers of that leader. Also, associations among the dimensions of transformational leadership and leaders' effectiveness might be based on individual information processing because the characteristics of a leader in a situation that engender "love" in some subordinates can generate "hate" in others (see Bass, 1985; Bass & Yammarino, 1988).

A fourth possibility is that the particular dimensions of focus for leader-follower interactions are neither individual- nor group-based. In this case, referred to as inexplicable by Dansereau, et al. (1984), there are no differences within or between groups and leaders so that a null condition is more likely. For example, transformational leadership can be viewed as operating at a different (perhaps higher) level of analysis and not relevant for individual followers nor a group of followers.

An Exploratory Investigation

The purpose of this study was to evaluate empirically the nature of leader-follower interactions as conceptualized here based on subordinates' views of their leaders. Using the model developed by Bass (1985), transformational leadership (charismatic, inspirational, individually considerate, and intellectually stimulating) was examined in comparison to transactional leadership (contingent rewarding and managing by exception) and laissez-faire or non-leadership as well as in relation to outcomes of leadership (subordinates' extra effort, satisfaction with the leader, and effectiveness of the leader). By examining transformational leadership as a part of a network of variables and in terms of multiple levels of analysis,

it is possible to determine whether the style of interaction between superior and subordinates is unique to certain leadership factors or generalizable across factors and outcomes. Moreover, these dimensions of leadership and outcomes were included in this study because their interrelationships are well established in prior work (Avolio & Bass, 1988; Bass, 1985; Bass & Avolio, in press; Bass, et al., 1987; Hater & Bass, 1988; Waldman, et al, 1988; Yammarino & Bass, 1988).

Although the same associations among leadership and outcomes were asserted in this study as in the previously cited research, developing hypotheses concerning the level of analysis that should best characterize transformational leadership and these relationships is problematic because prior work has provided support for each of the four approaches discussed (ALS, LMX, individual differences, and null). The literature, however, provides few clues as to the more likely approach for explanation. In addition, although the literature on transformational leadership does not explicitly conceptualize nor test for levels of analysis effects, the inferences previous authors have drawn about the theories and definitions of transformational leadership provide implicit support for each of the four models. Consequently, the portion of the hypotheses concerning the nature of superior-subordinate relationships or levels of analysis will remain exploratory. The alternative views of leader-follower relationships identified earlier will all be examined relative to one another to determine the more plausible explanation.

Method

Sample

The focal leaders for this study were all United States Navy (USN) officers who were United States Naval Academy (USNA) graduates on active

duty assigned to the surface warfare fleet. Originally, 330 officers were randomly selected by members of the USNA and Navy Personnel Research and Development Center (NPRDC) staffs to participate in the study. Of these, 54 officers were not reachable due to transferred assignments. From the remaining sample of 276 officers, 186 participated, yielding a response rate of about 67%.

The focal officers were commissioned in 1978 (n = 36), 1979 (n = 3i), 1983 (n = 51), and 1984 (n = 68), and held the ranks of 0-2 or Lieutenants Junior Grade (n = 71), 0-3 or Lieutenants (n = 114), and 0-4 or Lieutenant Commander (n = 1). All but one of the officers were males, and they were primarily 25-30 years (n = 120) and 31-35 years (n = 45) in age. They were assigned to a variety of types and sizes of ships.

Six senior subordinates of each officer were randomly selected and asked to provide information anonymously about the officers. For officers who had less than six subordinates, all their senior subordinates were asked to provide information. In all, 793 subordinates of the focal officers participated, yielding an average of 4.26 subordinates per officer. Ninety-eight officers (53%) were described by five or six subordinates, 58 officers (31%) by three or four subordinates, and 30 officers (16%) by one or two subordinates.

All subordinate survey materials were sent to the commanding officer of the ship on which the focal officers were serving. The CO was asked to relay the materials to the appropriate senior subordinates of the focal officers. All returns were made directly to the researchers. The subordinates who provided information about the officers were approximately 93% males. Most were 21-25 years (n = 213), 26-30 (n = 220), or 31-39 years (n = 275) in age. Most of the subordinates held the ranks of E-4 to E-6

(n = 171), E-7 to E-9 (n = 191), or O-1 to O-2 (n = 362), and generally had worked with the focal officers for three to six months (n = 184), seven months to one year (n = 243), or one to two years (n = 255).

Measures

The leadership and outcome data were collected using the Multifactor Officer Questionnaire (MLQ-Forms 11R and 11S) (Bass & Yammarino, 1987). This survey is a modified version of the Multifactor Leadership Questionnaire (MLQ) that has been described in detail elsewhere (Avolio & Bass, 1988; Bass, 1985; Bass & Avolio, in press). In Form 11, the number of scales was increased and the content was changed wherever necessary to better suit the military setting. This version of the survey was previously tested using a sample of 318 senior officers attending the Naval War College who described their most recent immediate superiors. The modified scales displayed adequate reliability, and the means, standard deviations, and correlations among the scales followed the same pattern as those for previous versions of the survey (see Yammarino & Bass, 1988).

Respondents completing the surveys indicated how frequently they observed behaviors of the focal officers and also reactions to the focal officers on a five-point format ranging from "not at all" (0) to "frequently, if not always" (4). These anchors have a magnitude estimation-based ratio to each other of 4:3:2:1:0 (Bass, Cascio, & O'Connor, 1974). For each scale, items were summed and divided by the appropriate number of items forming a scale score that ranged from zero to four.

Nine leadership scales were created for use in the current study. The four transformational leadership scales, the number of items in each, and examples of the items were:

1. Charisma (6 items) - "I am ready to trust him/her to overcome any obstacle."
2. Individualized Consideration (6 items) - "Gives personal attention to me when necessary."
3. Intellectual Stimulation (6 items) - "Shows me how to think about problems in new ways."
4. Inspirational Leadership (6 items) - "Provides vision of what lies ahead."

The four transactional leadership scales, the number of items in each, and examples of the items were:

5. Contingent Promises (3 items) - "Talks about special commendations and promotions for good work."
6. Contingent Rewards (3 items) - "Personally pays me a compliment when I do good work."
7. Active Management-by-Exception (4 items) - "Would reprimand me if my work was below standard."
8. Passive Management-by-Exception (4 items) - "Shows he/she is a firm believer in 'if it ain't broke, don't fix it'."

The non-leadership scale was:

9. Laissez-Faire (6 items) - "However I do my job is OK with him/her."

Several items were used to measure three outcome variables. Items were summed and divided by the appropriate number of items to form scale scores that ranged from zero to four. These included:

1. Extra Effort -- Four items were used to measure how much extra effort subordinates were willing to put forth in their jobs. For example, "I do more than I expected to do in my work." Items

from this scale used the same response format as the leadership items.

2. Satisfaction -- Two items were used to measure subordinates' satisfaction with their leader. For example, "In all, how satisfied were you that the methods of leadership used by this officer were the right ones for getting your unit's job done?" Response alternatives were on a five-point format ranging from "very dissatisfied" (0) to "very satisfied" (4).

3. Effectiveness -- Four items were used to measure the effectiveness of the focal officer. For example, "How effective is this officer in meeting the job-related needs of his/her subordinates?" Response alternatives were on a five-point format ranging from "not effective" (0) to "extremely effective" (4).

Analyses

Data were analyzed using Within and Between Analysis (WABA) procedures (see Dansereau, et al., 1984; Markham, 1988; Yammarino, Dubinsky, & Hartley, 1987; Yammarino & Naughton, 1988) to determine whether between-groups, within-groups, or individual differences was the appropriate level of analysis for understanding subordinates' ratings of their leaders. In WABA, within and between cell indicators are compared relative to one another with tests of practical (magnitude) and statistical significance. Cells are aligned with entities, groups or focal leaders in this study, and raw scores are partitioned into within and between cell deviation scores. Several correlations and tests are then computed from these scores.

The correlations that result from a set of within and between cell scores are summarized as follows:

$$\eta_{B_x} \quad \eta_{B_y} \quad r_{B_{xy}} \cdot + \quad \eta_{W_x} \quad \eta_{W_y} \quad r_{W_{xy}} \quad = \quad r_{xy}, \qquad (1)$$

where $^{\eta}B_x$ and $^{\eta}B_y$ are the between etas for variables x and y, respectively; $^{\eta}W_x$ and $^{\eta}W_y$ are the within etas for variables x and y, respectively; $^{r}B_{xy}$ and $^{r}W_{xy}$ are the between and within cell correlations, respectively, between variables x and y; and ^{r}xy is the raw score (total) correlation between variables x and y. Equation 1 is the WABA equation which specifies that any raw score correlation has two mathematically based components, a between cell component ($^{\eta}B_x$ $^{\eta}B_y$ $^{r}B_{xy}$) and a within cell component ($^{\eta}W_x$ $^{\eta}W_y$ $^{r}W_{xy}$), and thus, cannot be interpreted unambiguously if considered without regard for its components. The WABA equation summarizes and highlights differences in correlations within and between groups and leaders in the present study.

WABA I. Each leadership and outcome rating can display variation (valid differences) or can be constant (lack of differences) within and between cells. Within (η_W) and between (η_B) eta correlations based on ratings of focal leaders were used as indicators of variation or lack of variation. To test the within and between etas relative to one another, F- tests and E- tests were computed. F- tests of statistical significance have J-1 and N-J degrees of freedom for the between and within eta correlations, respectively. E- tests are geometrically-based tests of practical significance. These index the magnitude of the effects, are not dependent on degrees of freedom, and computed as follows:

$$E = \eta_B/\eta_W. \qquad (2)$$

These procedures for assessing the variation in each variable within and between focal leaders are called WABA I.

WABA II. The relationship between two variables (e.g., charisma and effectiveness) can be systematic (valid differences) or non-systematic (lack of differences or error) within and between cells. Within (r_W) and

between (r_B) cell correlations were used as indicators of systematic or non-systematic relationships between the measures. Differences between the independent within and between cell correlations for leadership and outcome ratings were examined with Z-tests and A-tests. Z-tests of statistical significance have J-3 and N-J-2 degrees of freedom for the transformed between (Z_B)- and within (Z_W)-cell correlations, respectively. A-tests of practical significance index the magnitude of the effects, are not dependent on degrees of freedom, are geometrically based, and computed as follows:

$$A = \Theta_W - \Theta_B, \tag{3}$$

where Θ_W and Θ_B are the angles associated with the within and between cell correlations, respectively. In addition, the magnitudes of each within and between cell correlation were tested with t-tests and R-tests. The t-tests of statistical significance of the between and within cell correlations have J-2 and N-J-1 degrees of freedom, respectively. Geometrically-based R-tests of practical significance which are not dependent on degrees of freedom, are computed as follows:

$$R_B = r_B/(1-r^2_B)^{\frac{1}{2}} \tag{4}$$

$$R_W = r_W/(1-r^2_W)^{\frac{1}{2}} . \tag{5}$$

These procedures for assessing covariation among variables within and between focal leaders are called WABA II.

Inferences. Based on the procedures in WABA I and II, inferences about whether a particular variable and relationship among variables are relevant for individuals or groups may be drawn (see Dansereau, et al., 1984; Markham, 1988; Yammarino, et al., 1987; Yammarino & Naughton, 1988). Briefly, .05 and .01 levels of statistical significance for F-, Z-, and t-tests are used in combination with 15° and more stringent/conservative 30°

levels of practical significance for E-, A-, and R-tests to draw conclusions. It is possible, for example, for the statistical tests to be significant while the practical tests lack significance. In this case, although the results are not influenced by sample size, they are of questionable magnitude. In the opposite case (practical significance but no statistical significance), the results are of sufficient magnitude, but sample size influences cannot be ruled out. Clearly, both the practical and statistical tests also may be significant, or non-significant.

Based on all tests associated with WABA, four inferences are plausible. First, if test results indicate that variation or covariation is more likely between than within groups, then the variables or relationship are relevant for the whole group. In this case there is an effect between groups and leaders -- subordinates' ratings within a group about a leader are consistent, but differ from the ratings of subordinates in other groups. This pattern of results would be compatible with the ALS approach, and a leader would display a consistent style toward the group as a whole. Second, when test results indicate that within rather than between group differences are more likely, the variables or relationship are also relevant for the groups, but are applicable in terms of the interdependent parts (dyads) of the groups. In this case there is an effect within groups and leaders -- subordinates' ratings within a group about a leader are interdependent and relative to one another, but are not identical. This within group variation and covariation is also displayed in other groups. This pattern of results would be compatible with the LMX approach, and a leader would display a different, but relative, style toward each subordinate. Third, test results may suggest that there is variation or covariation both within and between groups. This case can be viewed as

suggesting consistent individual differences because there is variation and covariation both between leaders and among the ratings of subordinates of the same leader. This pattern of results would be compatible with the information processing approach, and a leader's style would be "in the eye of the individual beholder." Fourth, test results may suggest a lack of systematic variation or covariation both within and between groups. This case can be viewed as analogous to a null condition.

Results

The findings for this study are summarized in Tables 1 to 5. Coefficient alpha reliabilities, means, standard deviations, and results from WABA I (etas and E- and F-tests) for each measure are presented in Table 1. The descriptive statistics for the current sample are similar to those reported by Yammarino and Bass (1988) for the Naval War College sample and by Bass and Avolio (in press) for other samples using the MLQ.

In terms of variance, results from WABA I indicate that the etas for within the groups describing the same leaders were larger than the etas for between the groups of subordinates describing different leaders for all the measures. Although seven of twelve E-tests were practically significant (indicating "within leaders" variation), all F-tests lacked statistical significance. Therefore, ratings by subordinates of their focal officers varied both within and between leaders, suggesting that individual differences in perceptions of the interactions among leaders and followers were more likely. Thus, neither the ALS nor LMX view was appropriate to infer when the variation in each leadership and outcome measure was examined separately. Some of the variation was due to the consistent differences between leaders who were being described by their different subordinates; some of the variance was due to the consistent differences among those

subordinates who were describing the same leader.

Insert Table 1 about here

In terms of covariance, results from WABA II (within and between correlations and A- and Z-tests) for the relationships among the leadership measures are presented in Table 2. The between groups correlations were larger than the within groups correlations for most relationships among the measures. Although some Z-tests were statistically significant, all A-tests lacked practical significance, indicating that the between groups correlations did not differ significantly from the within groups correlations. Moreover, most of the between and within groups correlations were practically and statistically significant. Thus, except for some relationships among the leadership measures involving laissez-faire leadership which are null, ratings by subordinates of their focal officers on multiple leadership measures covaried within and between leaders, suggesting that individual differences in perceptions of the interactions among leaders and followers were more likely.

Insert Table 2 about here

Results from WABA II (within and between correlations and A- and Z-tests) for the relationships among the outcome measures are presented in Table 3. The between groups correlations were larger than the within groups correlations for two of three relationships. The between groups correlation differed significantly (A- and Z-test) from the within groups correlation only for the effectiveness with satisfaction relationship. All of the

between and within groups correlations were practically and statistically significant. Thus, ratings by subordinates of their focal officers on effectiveness and satisfaction covaried between leaders, suggesting that a between leaders, ALS view of the interactions among leaders and followers was more likely. But this effect was weakened because the within groups correlation, like the between groups correlation, was also significant. This implies that there was also systematic within leaders covariation among these measures. For the other two relationships (extra effort with satisfaction and extra effort with effectiveness), individual differences in the perception of the interactions among leaders and followers were more likely.

Insert Table 3 about here

Results from WABA II (within and between correlations and A- and Z-tests) for the relationships among the leadership and outcome measures are presented in Table 4. For relationships involving effectiveness and satisfaction, the between groups correlations were larger than the within groups correlations; for relationships involving extra effort, the opposite case generally held. The between groups correlations differed significantly (A- and Z-tests) from the within groups correlations for three relationships involving effectiveness and four relationships involving satisfaction. Most of the between and within groups correlations were practically and statistically significant.

Several conclusions can be drawn from the results presented in Table 4. First, although some relationships among laissez-faire leadership and the other leadership measures were null, ratings by subordinates of their focal

officers on laissez-faire leadership, effectiveness, and satisfaction covaried between (but not within) groups, indicating that a between leaders, ALS view of the interactions among leaders and followers was more likely. These two effects (laissez-faire with effectiveness and laissez-faire with satisfaction) were strong because the within groups correlations (-.03 and -.01) lacked significance while the between groups correlations (-.34 and -.27) were practically and statistically significant. Second, five other relationships (charisma with effectiveness, charisma with satisfaction, individualized consideration with satisfaction, intellectual stimulation with effectiveness, and inspirational leadership with satisfaction) covaried between groups, suggesting that a between leaders, ALS view was more likely. But, these five effects were weakened because both the between and within groups correlations were significant. This implies that there was also systematic within leaders covariation among the measures. Third, three relationships (passive management-by-exception with effectiveness, passive management-by-exception with satisfaction, and laissez-faire with extra effort) were null, indicating that neither individual differences nor group-based perceptions of the interactions were likely. Fourth, for the remaining relationships displayed in Table 4, ratings by subordinates of their focal officers on multiple measures of leadership and outcomes covaried within and between leaders, implying that individual differences in perceptions of the interactions among leaders and followers were more likely.

Insert Table 4 about here

A summary of results from WABA for the relationships among the

leadership and outcome measures is presented in Table 5. In particular, the within and between groups (leaders) components and the resulting raw (total) correlations (see Equation 1) for the relationships are shown in the table. The components highlight the ambiguity of raw correlations. Although the raw correlations are consistent in magnitude and direction with prior research (e.g., Avolio & Bass, 1988; Bass, 1985; Bass & Avolio, in press), raw correlations of similar magnitude are not necessarily comprised of similar components nor are they necessarily interpreted similarly. For example, the magnitudes of the raw correlations for the laissez-faire with extra effort and laissez-faire with satisfaction relationships are identical; but using WABA, the former effect is actually null, while the latter is a between groups effect. Note the differences in the components in these cases. Likewise, the magnitudes of the raw correlations for the laissez-faire with effectiveness and passive management-by-exception with satisfaction relationships are similar; but using WABA, the former is actually a between groups effect, while the latter is null. Again, the components differ in these cases.

The between components are clearly larger than the within components for only two relationships in Table 5; i.e., laissez-faire with effectiveness and laissez-faire with satisfaction. Yet, the magnitudes of the raw correlations for these relationships are two of the smallest in the table. For the remaining relationships, the components are of similar magnitude or the within components are larger than the between components. In general, the findings highlight the fact that when WABA is used raw correlations of similar or identical magnitudes can have very different components, and these can lead to clarified inferences; i.e., individual differences, between groups, within groups (although there were none in this

study), or null effects.

Insert Table 5 about here

Discussion

Although some work in the leadership literature has focused on the issue of leader-follower relationships in terms of levels of analysis, this research has been largely ignored in the area of transformational leadership. The purpose of this study was to clarify conceptually and test empirically transformational leadership by focusing explicitly on multiple levels of analysis. As such, different views of leader-follower relationships were examined regarding transformational and transactional leadership and outcomes of leadership.

Results from Within and Between Analysis (Dansereau, et al., 1984; Markham, 1988; Yammarino, et al., 1987; Yammarino & Naughton, 1988) indicated that several relationships were based on between groups (leaders) differences or an Average Leadership Style view of leader-follower interactions. That is, subordinates' ratings within a group about a leader were consistent or similar, but differed from the ratings of subordinates in other groups. Thus, a leader displayed a consistent style toward the group as a whole and followers can be viewed as perceiving a similar interaction with their leader. This was the case, most notably, for two relationships between laissez-faire leadership and effectiveness and satisfaction, and to a lesser degree, for six additional relationships involving the transformational leadership dimensions and effectiveness and satisfaction. These findings were consistent with those reported by Yammarino and Bass

(1988) who also found support for an ALS view of leader-follower interactions using a different analytic procedure.

Although a few relationships were null, results from WABA suggested that the majority of the relationships among the measures were based on individual differences or an Information Processing view of leader-follower interactions. That is, subordinates' ratings about leaders differed both within and between groups. Thus, a leader's style was "in the eye of the individual beholder" and followers can be viewed as perceiving a unique interaction with their leader, independent of other followers. This was the case for all the relationships among the leadership dimensions (transformational, transactional, laissez-faire), most of the relationships among the outcome dimensions (extra effort, effectiveness, satisfaction), and a number of the relationships among the leadership-by-outcome dimensions. Moreover, consistent with prior research (e.g., Avolio & Bass, 1988; Bass, 1985; Bass & Avolio, in press), transformational leadership and the outcomes were highly, positively related, transactional leadership and the outcomes less so, and laissez-faire leadership and the outcomes were negatively associated. In general, these relationships held in terms of individual differences rather than group-based dynamics.

These individual differences results, that is, significant sources of variation and covariation both within and between leaders, are compatible with and clarify much theoretical and empirical work on transformational leadership. For example, in terms of charisma, the qualities or characteristics of a leader that generate admiration and respect in some subordinates can breed contempt and distrust in others. Likewise, an attempt to inspire subordinates may be viewed by some as spirited encouragement and support and by others as pure hokum. Thoughts and actions

necessary to stimulate subordinates intellectually are often an individualized phenomena tailored to each subordinate. Also, showing individualized consideration to subordinates often requires focusing on the uniqueness of each subordinate. Thus, the individual differences view of transformational leadership identified in this study enhances understanding of previous research in the area and is consistent with conceptual and applied work on transformational leaders.

Graphical illustrations summarizing the results from this study are presented in Figures 1 and 2. A distribution of the within and between leaders variance for each measure (WABA I) is shown in Figure 1. The percentage of within leaders variance exceeded the percentage of between leaders variance on all the measures. For seven measures (intellectual stimulation, inspirational leadership, contingent promises and rewards, active and passive management-by-exception, and laissez-faire leadership), the percentage of within leaders variation was significantly different from the percentage of between leaders variation (see E-tests in Table 1). A distribution of the within and between leaders covariance for the relationships among the leadership and effectiveness measures (WABA II) is shown in Figure 2. The percentage of between leaders covariance explained exceeded the percentage of within leaders covariance explained for all relationships. For three relationships (effectiveness with charisma, intellectual stimulation, and laissez-faire leadership), the percentage of between leaders covariance explained was significantly different from the percentage of within leaders covariance explained (see A-tests in Table 4). This pattern of results was consistent with those for the relationships among the leadership and satisfaction measures; but for the relationships among the leadership and extra effort measures, the percentages of within

and between leaders covariance explained were similar. In general, some of the variation and covariation was due to consistent differences between leaders who were described by their different subordinates; some of the variance and covariance was attributable to consistent differences among subordinates who rated the same leader.

Insert Figures 1 and 2 about here

The practical interpretation of the current results is that transformational leadership goes beyond transactions or exchanges to influence individual follower effort and satisfaction, and leader effectiveness. The act of helping to define individual, rather than group-based, follower objectives and associated rewards may be a basis for effective leadership, but is not sufficient to ensure maximum effort and performance. Additional leadership which generates confidence and inspiration in the individual follower, rather than in a group of followers, may result in heightened outcomes.

Several recommendations for future research on transformational leadership are suggested by the results of this study. First, extending the number and types of leaders for investigation across different positions, levels, settings, and cultures seems important to determine whether the results are generalizable. The pattern of interaction identified between leader and followers may be dictated by the leader's span of control, the job assignment and rank the leader holds, or the culture of the organization. Future research could assess such contextual factors that may moderate leader-follower relationships so better understanding of interactions between transformational leaders and their followers can be

gained. Thus, higher levels of analysis need to be examined.

Second, future research could examine transformational leadership, outcomes, and interactions with followers using multiple measures. The results obtained in this study may be due to the items used in the MLQ. It seems important to broaden the base of measures, while also using trained observers to evaluate the interactions between leaders and followers. Using reports from different perspectives may help to clarify aspects of the leader's behavior either overlooked or ignored by followers.

Third, obtaining the leader's perspective on his/her interactions with each follower could be the subject of future research on transformational leadership. "Matching" leader and follower reports would help to better determine the appropriate level of analysis for understanding transformational leadership by focusing on a "true" dyadic perspective. Without such matched reports, it is impossible to determine definitively which level of analysis best characterizes the interaction pattern between leader and follower. Independent dyads separate from formally assigned work groups are required.

Fourth, the type of interaction between leader and followers is one that has developed over time. Thus, determining the stability or change of transformational leadership as perceived by followers and leaders over time will require longitudinal data collection and analysis. Essentially, explicit consideration of lower (person and dyad) as well as higher (context, organization) levels of analysis in conceptualization and empirical testing are important to enhance understanding of transformational leadership.

References

Avolio, B.J., & Bass, B.M. (1988). Transformational leadership, charisma and beyond. In J.G. Hunt, B.R. Baliga, H.P. Dachler, & C.A. Schriesheim (eds.), Emerging leadership vistas (pp. 29-50). Lexington, MA: Lexington Books.

Bass, B.M. (1985). Leadership and performance beyond expectations. New York: Free Press.

Bass, B.M., & Avolio, B.J. (in press). The multifactor leadership questionnaire. Palo Alto, CA: Consulting Psychologists Press.

Bass, B.M., Cascio, W.F., & O'Connor, E. (1974). Magnitude estimations of frequency and amount. Journal of Applied Psychology, 59, 313-320.

Bass, B.M., Waldman, D.A., Avolio, B.J., & Bebb, M. (1987). Transformational leadership and the falling dominoes effect. Group and Organization Studies, 12, 73-87.

Bass, B.M., & Yammarino, F.J. (1987). Multifactor officer questionnaire: MLQ Forms 11R and 11S. Binghamton, NY: Center for Leadership Studies, State University of New York at Binghamton.

Bass, B.M., & Yammarino, F.J. (1988). Leadership: Dispositional and situational. Technical Report No. ONR-TR-1, Office of Naval Research, Arlington, VA.

Bradley, R.T. (1987). Charisma and social structure. New York: Paragon House.

Burns, J.M. (1978). Leadership. New York: Harper.

Conger, J.A., & Kanungo, R.N. (1988). Charismatic leadership. San Francisco, CA: Jossey-Bass.

Dansereau, F., Alutto, J.A., & Yammarino, F.J. (1984). Theory testing in organizational behavior: The varient approach. Englewood Cliffs, NJ:

Prentice Hall.

Dansereau, F., Graen, G., & Haga, W.J. (1975). A vertical dyad linkage approach to leadership within formal organizations: A longitudinal investigation of the role-making process. Organizational Behavior and Human Performance, 13, 46-78.

Dienesch, R.M., & Liden R.C. (1986). Leader-member exchange model of leadership: A critique and further development. Academy of Management Review, 11, 618-634.

Eden, D., & Leviatan, U. (1975). Implicit leadership theory as a determinant of the factor structure underlying supervisory behavior scales. Journal of Applied Psychology, 60, 736-741.

Graen, G., Novak, M., & Sommerkamp, P. (1982). The effects of leader-member exchange and job design on productivity and satisfaction: Testing a dual attachment model. Organizational Behavior and Human Performance, 30, 109-131.

Hater, J., & Bass, B.M. (1988). Superiors' evaluations and subordinates' perceptions of transformational and transactional leadership. Journal of Applied Psychology, 73, 695-702.

House, R.J. (1977). A 1976 theory of charismatic leadership. In J.G. Hunt & L.L. Larson (eds.), Leadership: The cutting edge (pp. 189-207). Carbondale, IL: Southern Illinois University Press.

Howell, J.M., & Frost, P.J. (in press). A laboratory study of charismatic leadership. Organizational Behavior and Human Decision Processes.

Kerr, S., & Schriesheim, C.A. (1974). Consideration, initiating structure, and organizational criteria: An update of Korman's 1966 review. Personnel Psychology, 27, 555-568.

Kuhnert, K.W., & Lewis, P. (1987). Transactional and transformational

leadership: A constructive/developmental analysis. Academy of Management Review, 12, 648-657.

Lord, R.G., Binning, J.F., Rush, M.C., & Thomas J.C. (1978). The effect of performance cues and leader behavior on questionnaire ratings of leader behavior. Organizational Behavior and Human Performance, 21, 27-39.

Markham, S.E. (1988). Pay-for-performance dilemma revisited: Empirical example of the importance of group effects. Journal of Applied Psychology, 73, 172-180.

Rush, M.C., Thomas, J.C., & Lord, R.G., (1977). Implicit leadership theory: A potential threat to the internal validity of leader behavior questionnaires. Organizational Behavior and Human Performance, 20, 93-110.

Schriesheim, C.A., & Kerr, S. (1977). Theories and measures of leadership: A critical appraisal of current and future directions. In J.G. Hunt and L. L. Larson (eds.), Leadership: The cutting edge (pp. 9-45). Carbondale, IL: Southern Illinois University Press.

Seers, A., & Garen, G. (1984). The dual attachment concept: A longitudinal investigation of the combination of task characteristics and leader-member exchange. Organizational Behavior and Human Performance, 33, 283-306.

Waldman, D.A., Bass, B.M., & Einstein, W.O. (1987). Leadership and outcomes of performance appraisal processes. Journal of Occupational Psychology, 60, 177-186.

Waldman, D.A., Bass, B.M., & Yammarino, F.J. (1988). Adding to leader-follower transactions: The augmenting effect of charismatic leadership. Technical Report No. ONR-TR-3, Office of Naval Research, Arlington, VA.

Weber, M. (1923/1963). The sociology of religion. Beacon, NY: Beacon Press.

Yammarino, F.J, & Bass, B.M. (1988). Long term forecasting of transformational leadership and its effects among Naval Officers: Some preliminary findings. Technical Report No. ONR-TR-2, Office of Naval Research, Arlington, VA.

Yammarino, F.J., Dubinsky, A.J., & Hartley, S.W. (1987). An approach for assessing individual versus group effects in performance evaluations. Journal of Occupational Psychology, 60, 157-167.

Yammarino, F.J., & Naughton, T.J. (1988). Time spent communicating: A multiple levels of analysis approach. Human Relations, 41, 655-676.

Table 1

Descriptive Statistics and Within and Between Groups (Leaders) Variance for Measures (WABA I)

Measures	α	M	SD	Etas		Tests	
				Between	Within	E	F[a]
Transformational							
Charisma	.94	2.48	1.26	.70	.71	.99	.31
Individualized Consideration	.86	2.66	1.17	.61	.79	.78	.49
Intellectual Stimulation	.88	2.63	1.15	.57	.82	.70≠	.62
Inspirational Leadership	.82	2.45	1.15	.58	.82	.71≠	.60
Transactional							
Contingent Promises	.67	1.88	1.38	.58	.82	.71≠	.60
Contingent Rewards	.91	2.59	1.52	.58	.81	.72≠	.58
Active Mgt.-by-Exception	.71	2.92	1.29	.57	.82	.69≠	.63
Passive Mgt.-by-Exception	.59	2.47	1.10	.56	.83	.67≠	.66
Non-Leadership							
Laissez-Faire	.63	1.49	.99	.60	.80	.74≠	.55
Outcomes							
Extra Effort	.81	2.79	.99	.64	.76	.84	.42
Effectiveness	.89	2.81	1.06	.67	.74	.91	.36
Satisfaction	.92	3.01	1.59	.63	.77	.82	.45

[a]Degrees of freedom = 185, 607.
≠ 15°

Table 2
Within and Between Groups (Leaders) Covariance Among Leadership Measures (WABA II)

Measures	CH		IC		IS		IL		CP		CR		AM		PM	
	r_B	r_W	r_B	r_W	r_B	r_W	r_B	r_W	r_B	r_W	r_B	r_W	r_B	r_W	r_B	r_W
Charisma (CH)	--	--														
Individualized Consideration (IC)	.77	.71	--	--												
Intellectual Stimulation (IS)	.78	.66	.82	.79	--	--										
Inspirational Leadership (IL)	.80	.71	.85	.78	.86	.81	--	--								
Contingent Promises (CP)	.59	.49	.78	.66	.72	.63	.73	.68	--	--						
Cont. Rewards (CR)	.64	.60	.86	.81	.70	.71	.75	.73	.74	.66	--	--				
Active Mgt.-by-Exception (AM)	.40	.33	.59	.53	.65	.60	.58	.54	.60	.52	.60	.51	--	--		
Passive Mgt.-by-Exception (PM)	.27	.26	.47	.45	.36	.41	.43	.44	.44	.43	.44	.45	.30	.39	--	--
Laissez-Faire (LF)	-.19	.01	.07	.17	-.02	.17	.08	.25	.26	.27	.19	.25	.23	.24	.47	.45

	CH		IC		IS		IL		CP		CR		AM		PM	
	A	Z	A	Z	A	Z	A	Z	A	Z	A	Z	A	Z	A	Z
Charisma (CH)	--	--														
Individualized Consideration (IC)	.09	1.52	--	--												
Intellectual Stimulation (IS)	.18	3.12**	.06	1.15	--	--										
Inspirational Leadership (IL)	.13	2.43**	.12	2.37**	.09	1.94*	--	--								
Contingent Promises (CP)	.11	1.59	.17	2.97**	.12	1.97*	.08	1.27	--	--						
Cont.Rewards (CR)	.04	.64	.09	2.00*	-.01	-.19	.04	.64	.11	1.87*	--	--				
Active Mgt.-by-Exception (AM)	.08	.99	.07	1.02	.07	.99	.05	.71	.10	1.47	.10	1.46	--	--		
Passive Mgt.-by-Exception (PM)	.01	.09	.03	.34	-.06	-.71	-.01	-.02	.01	.14	-.01	-.02	-.10	-1.30	--	--
Laissez-Faire (LF)	.18	2.11*	-.10	-1.18	-.15	-1.81*	-.18	-2.15*	-.01	-.12	-.05	-.66	-.01	-.05	.02	.27

Note: Between df = 184: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .14$, $p \leq .05$; $r \geq .19$, $p \leq .01$.
Within df = 606: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .08$, $p \leq .05$; $r \geq .11$, $p \leq .01$.
Z-test degrees of freedom = 183, 605.

*$p \leq .05$ **$p \leq .01$

Table 3

Within and Between Groups (Leaders) Covariance Among Outcome Measures (WABA II)

Measures	Extra Effort		Effectiveness		Satisfaction	
	r_B	r_W	r_B	r_W	r_B	r_W
Extra Effort	--	--				
Effectiveness	.53	.56	--	--		
Satisfaction	.60	.45	.78	.56	--	--

	Extra Effort		Effectiveness		Satisfaction	
	A	Z	A	Z	A	Z
Extra Effort	--	--				
Effectiveness	-.04	-.56	--	--		
Satisfaction	.17	2.33**	.30≠	4.83**	--	--

Note: Between df = 184: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .14$, $p \leq .05$; $r \geq .19$, $p \leq .01$.
Within df = 606: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .08$, $p \leq .05$; $r \geq .11$, $p \leq .01$.
Z-test degrees of freedom = 183, 605.
≠15° *$p \leq .05$ **$p \leq .01$

Table 4

Within and Between Groups (Leaders) Covariance Among Leadership and Outcome Measures (WABA II)

	Extra Effort		Effectiveness		Satisfaction	
Measures	r_B	r_W	r_B	r_W	r_B	r_W
Charisma	.63	.62	.85	.65	.79	.58
Individualized Consideration	.68	.67	.61	.53	.68	.46
Intellectual Stimulation	.53	.54	.67	.45	.60	.41
Inspirational Leadership	.61	.64	.70	.54	.66	.44
Contingent Promises	.46	.42	.42	.33	.49	.28
Contingent Rewards	.53	.57	.49	.44	.57	.41
Active Mgt.-by-Exception	.28	.30	.32	.18	.28	.14
Passive Mgt.-by-Exception	.41	.36	.18	.17	.18	.12
Laissez-Faire	.08	.14	-.34	-.03	-.27	-.01

	Extra Effort		Effectiveness		Satisfaction	
	A	Z	A	Z	A	Z
Charisma	.01	.16	.31ǂ	5.80**	.29ǂ	4.73**
Individualized Consideration	.01	.22	.10	1.41	.27ǂ	3.88**
Intellectual Stimulation	-.02	-.22	.26ǂ	3.73**	.22	3.08**
Inspirational Leadership	-.04	-.59	.20	3.06**	.27ǂ	3.81**
Contingent Promises	.05	.70	.09	1.20	.23	2.90**
Contingent Rewards	-.05	-.67	.05	.70	.19	2.59**
Active Mgt.-by-Exception	-.02	-.28	.15	1.80*	.14	1.66*
Passive Mgt.-by-Exception	.06	.72	.01	.06	.07	.84
Laissez-Faire	-.06	-.75	.32ǂ	3.81**	.26ǂ	3.11**

Note: Between df = 184: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .14$, $p \leq .05$; $r \geq .19$, $p \leq .01$.
Within df = 606: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .08$, $p \leq .05$; $r \geq .11$, $p \leq .01$.
Z-test degrees of freedom = 183, 605.
ǂ15° *$p \leq .05$ **$p \leq .01$

Table 5
Summary of Within and Between Groups (Leaders) Relationships
Among Leadership and Outcomes

	Extra Effort			Effectiveness			Satisfaction		
	WABA Components			WABA Components			WABA Components		
Measures	Between	Within	Raw (Total) Correlation	Between	Within	Raw (Total) Correlation	Between	Within	Raw (Total) Correlation
Transformational									
Charisma	.28	.34	.62	.40	.34	.74	.35	.32	.67
Individualized Consideration	.27	.40	.67	.25	.31	.56	.26	.28	.54
Intellectual Stimulation	.19	.34	.53	.26	.28	.54	.22	.26	.48
Inspirational Leadership	.23	.40	.63	.27	.33	.60	.24	.28	.52
Transactional									
Contingent Promises	.17	.26	.43	.16	.20	.36	.18	.18	.36
Contingent Rewards	.20	.35	.55	.19	.26	.45	.21	.25	.46
Active Mgt.-by-Exception	.10	.19	.29	.12	.11	.23	.10	.09	.19
Passive Mgt.-by-Exception	.15	.23	.38	.07	.10	.17	.07	.07	.14
Non-Leadership									
Laissez-Faire	.03	.08	.11	-.13	-.02	-.15	-.10	-.01	.11

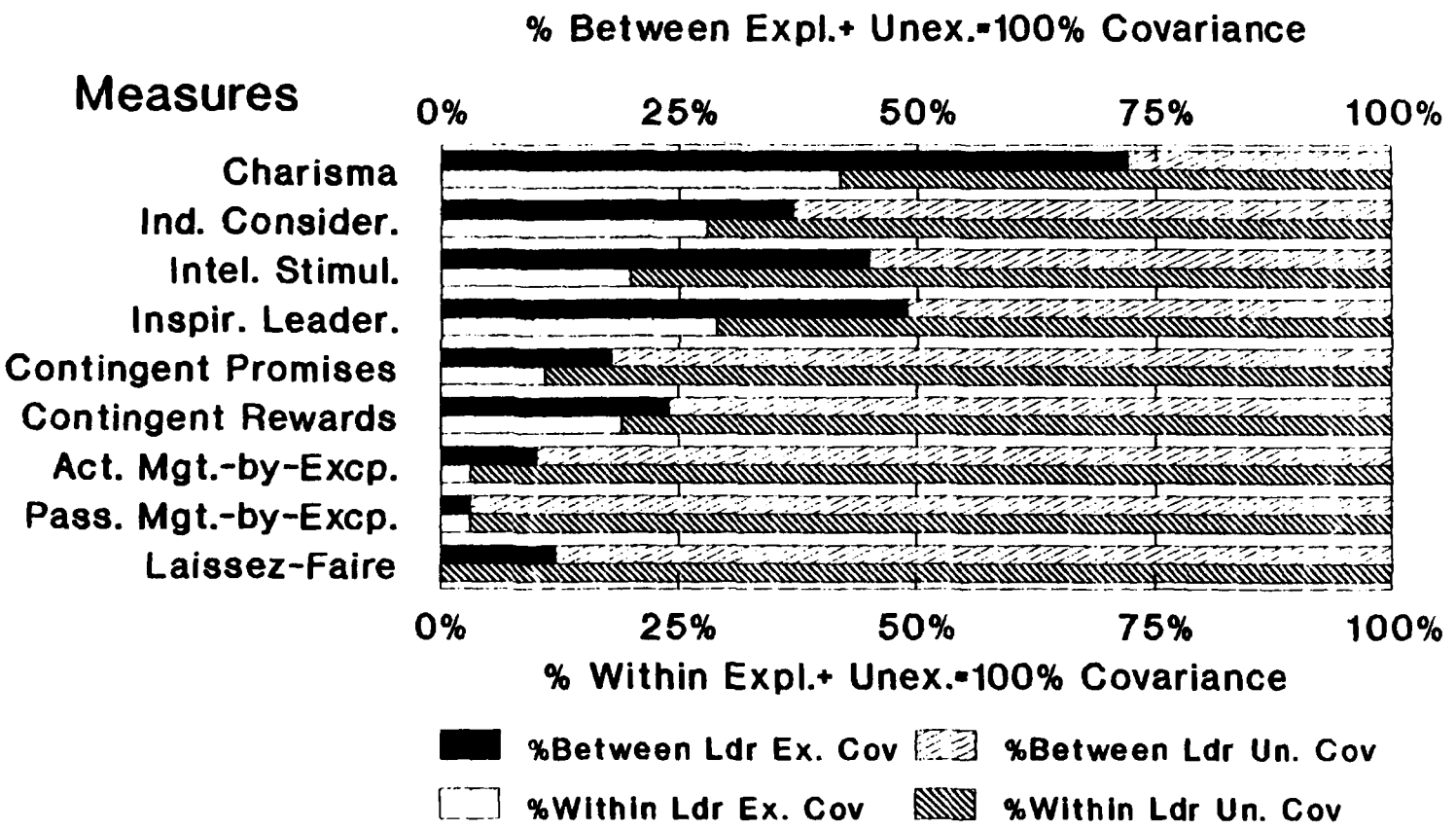
Note: Raw (total) df = 791: $r \geq .26$, 15°; $r \geq .50$, 30°; $r \geq .07$, $p \leq .05$; $r \geq .10$, $p \leq .01$.

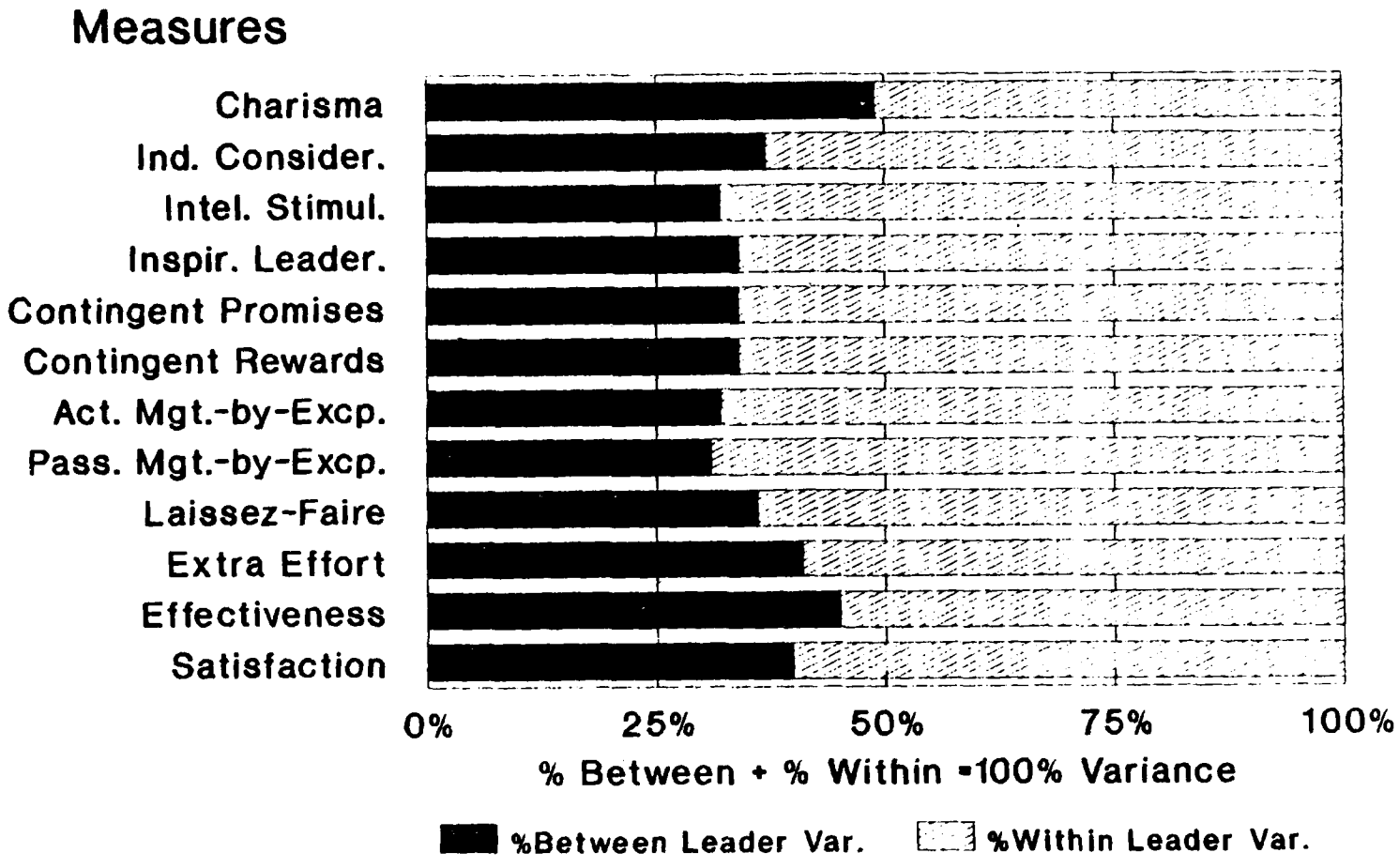
Figure Captions

Figure 1. Distribution of within and between leaders variance for measures (WABA I).

Figure 2. Distribution of within and between leaders covariance among leadership measures and effectiveness (WABA II).

Leadership and Effectiveness

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Charisma
Ind. Consider.
Intel. Stimul.
Inspir. Leader.
Contingent Promises
Contingent Rewards
Act. Mgt.-by-Excp.
Pass. Mgt.-by-Excp.
Laissez-Faire
Extra Effort
Effectiveness
Satisfaction
0%
25%
50%
75%
100%
% Between + % Within =100% Variance
%Between Leader Var.
%Within Leader Var.

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